

Application No. 09/526,317

AMENDMENTS TO THE SPECIFICATIONIn the Specification

Please substitute the following amended paragraph(s) and/or section(s) (deleted matter is shown by strikethrough and added matter is shown by underlining):

Page 1, line 2, please insert the following heading and paragraph:

Cross Reference to Related Applications

This is a continuation of Application No. PCT/GB98/02772 filed September 14, 1998.

Page 1, before line 3, please insert the following heading:

Field of the Invention

The present invention relates to fluid separation systems. It is particularly concerned with the selective removal of a component or components from a mixture of gases using liquid solvent and is more particularly concerned with the absorption of acid gases such as CO₂, NO_x, H₂S, oxides of sulphur etc. from natural gas and from combustion gases.

Page 1, before line 8, please insert the following heading:

Background of the Invention

Conventional systems for the absorption of acid gases employ a liquid solvent; typical solvents include amines such as methyldiethanolamine (MDEA), monoethanolamine (MEA) or diethanolamine (DEA) and mixtures of solvents. These solvents absorb CO₂, NO_x, H₂S and other acid gases. The solvent is contacted with the sour gas mixture (gas mixture including acid gases) in a column which may be a packed column, a plate column or a bubble-

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cap column, or a column with some other form of contact medium. In these systems, the gas and liquid streams flow countercurrently.

Page 1, before line 15, insert the following heading:

Summary of the Invention

The prior art absorption systems suffer the disadvantage that in order to achieve a significant degree of gas/liquid contact, the columns have to be large and their operation is hampered by excessive foaming. In addition, the subsequent stripping section which removes the acid gas from solution must also be large, to handle the large volume of solvent used. Since the operation normally takes place under high pressure and the fluids involved are highly corrosive, the capital costs of the large columns and subsequent stripping section is high. Furthermore, operating costs and maintenance costs are high.

Pages 7, line 31 through page 8, line 2:

The invention may be put into practice in various ways and a number of specific embodiments will be described by way of example to illustrate the invention with reference to the accompanying drawings, in which:

Page 8, before line 3, insert the following heading:

Brief Description of the Drawings

Figure 1 is a flow diagram of the process for use when the gas is under low pressure;

Page 8, after line 22, please insert the following heading:

Detailed Description of the Drawings

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In one embodiment of the invention, a continuous process operation for the removal of one or more selected gases from a gas stream is shown in figure 1. A liquid solvent stream 1, for example MEA (monoethanolamine), is conducted by a pump 2 to a first turbulent contactor 3 (though this could be an ejector) capable of inducing turbulent mixing. A gas stream 4, including the gases which are to be removed, is drawn into the first contactor 3 by the low pressure generated in the venturi by the liquid stream after it has passed through the pump (stream 1a). This arrangement provides an automatic means of self-regulation as the gas mixture to solvent ratio can be maintained for varying flow rates. At the outlet of the first contactor 3 the liquid solvent and the gas stream are in the form of a homogeneous mixture (stream 5) and the mass transfer of the selected gases from the gas phase to the liquid occurs very rapidly.

Page 14, line 13:

The apparatus in figure 9 comprises a contactor 51, corresponding to that shown in figure 3, a vertical pipe section 56 leading from the venturi 52, and a horizontal pipe section 59 joining the vertical section 56 to a receiver 61, and having quick closing valve 50. The vertical section 56 has two quick closing valves 57, 58. A reservoir of liquid solvent 54 leads to the contactor 51 via a valve 55. A diesel engine 75 has its exhaust connected to the contactor via a line 71 including an orifice plate 74. The line 71 is provided with a by-pass valve 70 in a by-pass line 72.

In the Abstract

Please substitute the following amended Abstract for the Abstract as currently pending (deleted matter is shown by strikethrough and added matter is shown by underlining):